CONSERVATION CURRICULUM

Hot off the Press!

In the following pages you will find conservation activities from some of the Department's newest curriculum. These materials, along with a multitude of others, are available free to educators in Missouri. They can be requested online at <www.conservation.state.mo.us> or by contacting your local MDC office and asking for a Conservation Education Materials Request Form. This issue features activities from:

Conservation Seeds:
A comprehensive conservation education program for Pre K -2. Includes a 336-page teacher activity book, seasonal posters and identification cards.

Prairie Habitat Pack:
Thematic unit about prairies for grades 3-4. Includes a teacher guide, student magazines, colorful posters and supplemental resources.

Amphibians and Reptiles:
A new teacher's guide on Missouri Herps with background information and multidisciplinary activities for junior and senior high school.

CONGRATULATIONS!!!

Sarah Williams of Brookfield, Missouri winner of the Missouri Best-of-Show in the 2002 Jr. Duck Stamp and Design Contest, went on to receive 3rd place at this year's National Contest.

Students in grades K-12 are invited to submit original artwork depicting Missouri's waterfowl to the state contest. Participation in this program promotes learning about wetlands, waterfowl and other aquatic resources. Information is sent to schools in early fall and submissions are due in early March.

The Missouri Department of Conservation has coordinated this program in the past. Starting with the 2002-03 school year the state program will be coordinated by the U.S. Fish and Wildlife Service. Please request information by contacting one of the following:

Tim Haller
Big Muddy Wildlife Refuge
4200 New Haven Road
Columbia, MO 65201
Tim_Haller@fws.gov

Charles E. Marshall
Squaw Creek National Wildlife Refuge
PO Box 158
Mound City, MO 64470
Charlie_Marshall@fws.gov

Outside In

Each issue of "Conservation Curriculum" will have a component that can serve as a teacher guide to Outside In, the student insert of the *Missouri Conservationist* magazine. Issues correspond as follows:

August *Outside In*
October Conservation Curriculum

November *Outside In*
December Conservation Curriculum

February *Outside In*
February Conservation Curriculum

May *Outside In*
April Conservation Curriculum

Schools can request classroom sets (30 copies, 1 copy serves 5 students), of *Outside In* for up to 8 sets or 240 copies per school. Materials are sent to school librarians and teachers are encouraged to share classroom sets. You can order by writing: Missouri Department of Conservation, Missouri Conservationist Magazine, PO Box 180, Jefferson City, MO 65102-0180.

Nature Jar

PreK-2

From: *Conservation Seeds*; Missouri Department of Conservation

Did You Know?

The purpose of flowers is seed making. One flower can produce one or many seeds. Seeds are the plant's way of reproducing itself. This activity will expose children to different kinds of seeds and their purpose.

You'll Need:

- Collection bag for each child
- Glue, Crayons, Scissors, Tape, Markers
- Instant camera and film (optional)
- Large piece of paper
- Heavy paper, cardboard or plastic foam meat tray for each child

What To Do:

1. During outside self-selected activity time, ask children to gather seeds, berries, and other fruits to put into the container. Emphasize that none of these are for eating and must not be put into their mouths. Be certain that children do not collect poison ivy berries.
2. Make the collection available for children to explore, sort, compare and match the items.
3. As children work, talk about the purpose of seeds and how seeds come in pods, nuts and other fruits.

Questions You Might Ask:

- Why do plants make seeds?
- How are seeds dispersed or scattered?
- How do people use seeds?
- What foods do people eat that are seeds?

Supplementary Activities:

A. *Art* – During self-selected activity time, provide materials for children to make seed and leaf collages.

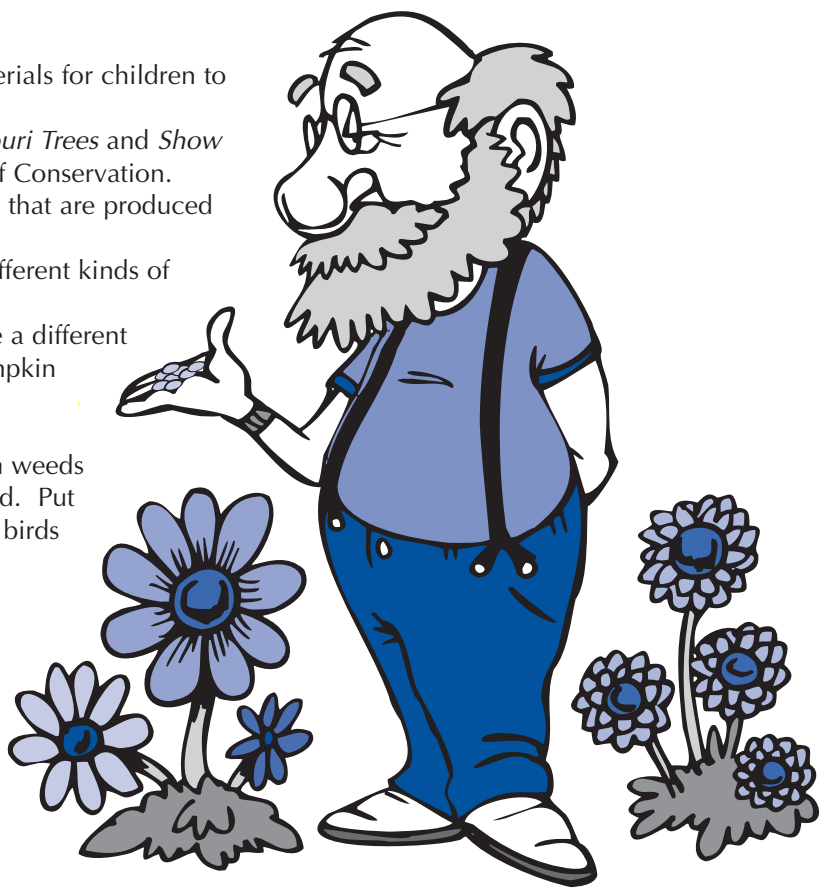
B. *Bulletin Board* – Display the posters *Common Missouri Trees* and *Show Me Trees*, available from the Missouri Department of Conservation. These posters illustrate the flowers, leaves and seeds that are produced by common Missouri trees.

C. *Group* – Play "what's missing" with several of the different kinds of seeds.

D. *Nutrition* – Plan a "seed of the day" snack and serve a different type of seed each day, such as sunflower seeds, pumpkin seeds, peanuts, popcorn, etc.

E. *Outside* – During outside self-selected activity time, encourage children to collect seeds and berries from weeds and trees. Compare these with commercial bird seed. Put the collected seed in a bird feeder and see what the birds prefer. Make a chart recording the children's observations.

F. *Science* – During self-selected activity time, display the nature jar in the classroom and let the children dump it out and match the seeds and fruits. Add a scale to the area so children can explore weights of the various items.



Grasslands Galore

3-4

From: *Prairie Habitat Pack*; Missouri Department of Conservation

Vocabulary:

Prairie, grassland, forbs, roots, decompose

Objectives:

Students will be able to:
- Define a prairie.
- Describe the uses people have for the prairie.
- Locate other prairies in the world.

Pre-Discussion Questions:

1. What is a prairie?
2. How did people use prairies in the past?
3. How do people use the prairie today?

Text:

The first Europeans to encounter the vast **grasslands** of central North America experienced a landscape unlike anything they had ever seen. They named these areas **prairie** after the French word for a grassy meadow. Prairies are diverse grasslands with an abundance of plants and animals that have adapted specifically for the prairie environment. At the time of European settlement, at least 15 million acres of prairie existed in Missouri, covering more than one-third of the state. Today, fewer than 90,000 acres (less than 1 percent of Missouri's original prairie) remain.

Different types of grasslands occur throughout the world. The North American grasslands, called prairie, were shaped by climate. Increased precipitation allows vegetation to grow thick and lush. Shortgrass prairie occurs near the Rocky Mountains, where rainfall is low. Tallgrass prairie grows on the eastern side of the Plains, with rainfall exceeding 30 inches annually.

Missouri's prairies are dominated by tall grasses with a diversity of wildflowers. Prairie wildflowers are called **forbs.** Many prairie plants have very deep **roots.** These root systems are **decomposed** by microorganisms, creating very deep, rich soil. The prairie is the most altered ecosystem in the U.S. Within the past 150 years, humans have plowed the prairies, suppressed naturally-occurring wildfires and seeded the grasses that were not originally found on the prairie. Prairies form deep, rich soil and they were quickly plowed for growing crops. Settlers feared raging prairie wildfires (with good reason) and worked hard to suppress them. The introduction of barbed wire kept cattle confined and over-grazing eliminated many plant species. From settlement to the present, exotic plants or plants not native to Missouri have been introduced on the prairie. Some are extremely aggressive, choking out native species. Today, people still use the prairie for farming crops, such as wheat and corn, and for grazing cattle. Our rich prairie soils help feed the world.

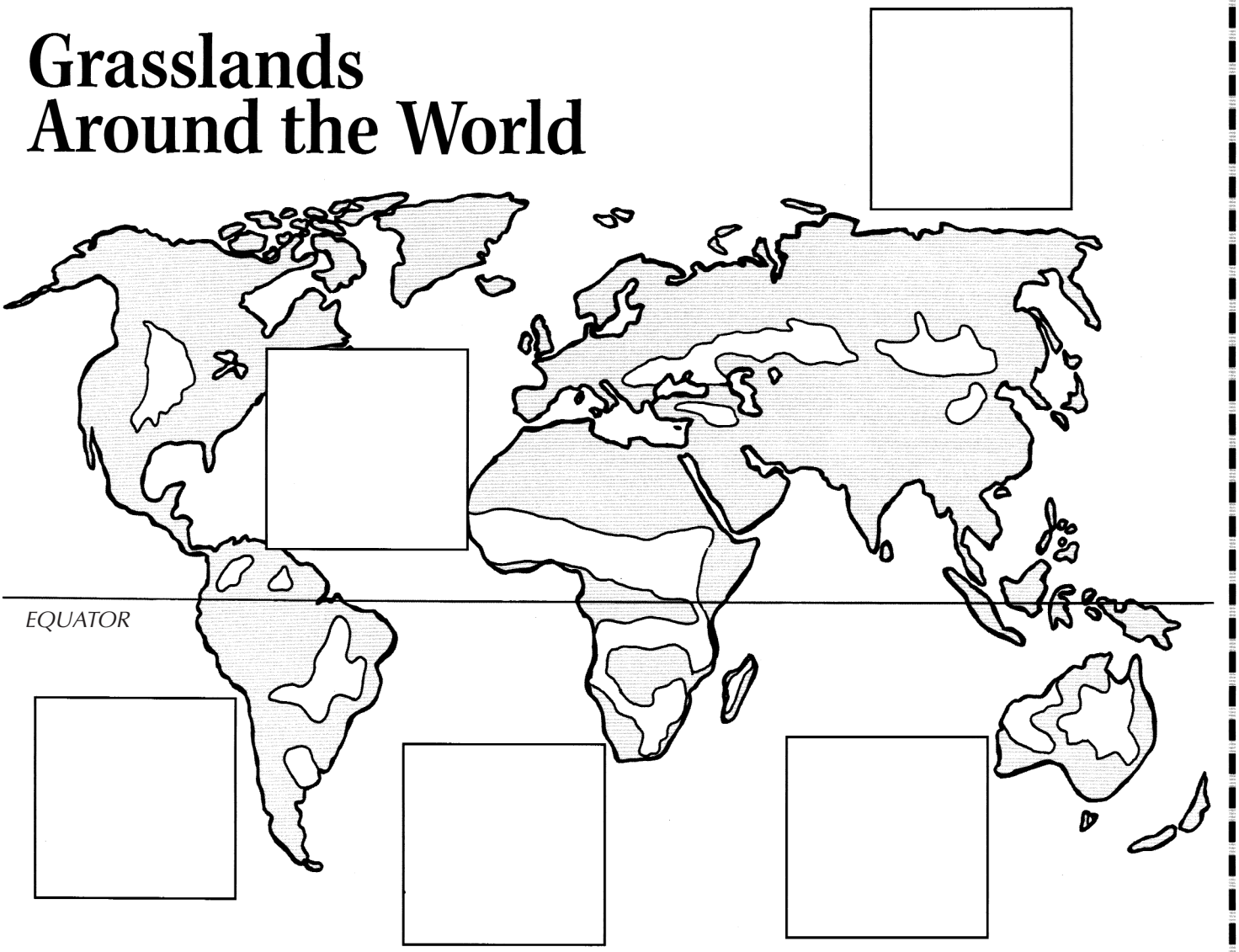
The results of the alterations to prairie have been dramatic. In the absence of fire, trees have invaded the prairie, shading out sunlight essential to prairie plant growth. Habitat destruction threatens many species dependent on prairies. Eliminating large predators such as wolves and mountain lions has allowed populations of smaller furbearers such as raccoons, skunks and opossums to increase. The tremendous loss of prairie habitat and the disruption of the predator and prey relationships have made it very difficult for some grassland species to survive. Missourians should recognize the treasures held in prairies.

Have students complete the activity on the "Grasslands Around the World" copy page. Discuss the importance of grasslands around the world. Why do different animals exist in each type of grass land?

Post Discussion Questions:

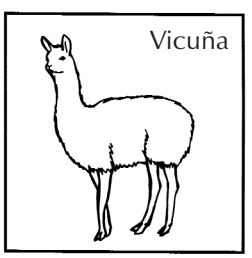
What is a prairie? A grassland ecosystem where hundreds of plants, animals and other organisms make up a diverse community; not just grass like lawns or cow pastures.
Why should we care about the prairies? Answers may vary.

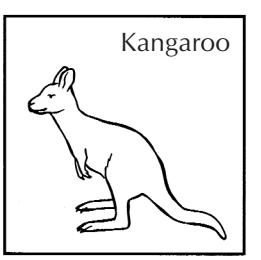
Grasslands Around the World

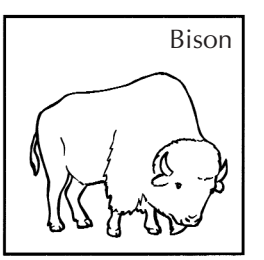


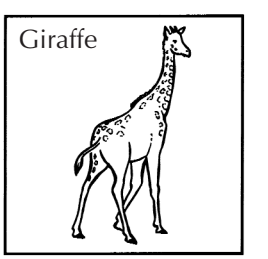
Grasslands are found all over the world. They have different names on each continent. Color the grasslands listed below and cut out the picture of the animal that lives in that grassland. Paste it on the map near where the animal lives.

1. PRAIRIES are the grasslands found in North America. Color the prairies GREEN.
2. PAMPAS are the grasslands found in South America. Color the pampas RED.
3. STEPPES are the grasslands found in Asia. Color the steppes BLUE.
4. VELDTS are the grasslands found in Africa. Color the veldts YELLOW.
5. SCRUBS are the grasslands found in Australia. Color the scrubs PURPLE.









5-8 Mole Crickets, Crawfish Frogs, & a few Prairie Oddballs

After researching a variety of prairie species your students can turn the information into newspaper classified ads and a game of "Who Am I."

Materials:

Missouri Department of Conservation *Prairie: Life Among the Grasses* poster, prairie plant and animal identification guides, reference books

Background:

Diversity is a key descriptor of a prairie habitat. Animal species range from the minuscule prairie mound ant to the burrowing badger and the once abundant 2,000 pound bison. Plants dominate the landscape with grasses and forbs reaching heights of 7' and boasting root systems extending 15' down into the rich prairie soils. Among the prairie species are a few "oddballs" who have developed unique adaptations to aid in their survival in these grasslands habitats. Some of these include:

Grassland Crayfish	Northern Crawfish Frog
Round-winged Katydid	Prairie Mole Cricket
Ornate Box Turtle	Burrowing Owl
Narrow Mouth Toads	Short Eared Owls
Upland Sandpiper	Regal Fritillary Butterfly
Northern Harrier	Slender Glass Lizard
Great Plains Skink	Compass Plant
Royal Catchfly	Prairie Mound Ants

Procedure

Using the Prairie: Life Among the Grasses poster, which includes color drawings and descriptions of 38 species found in Missouri prairies, and other references have your students select a plant or animal from the list above (or other prairie species) and develop a characteristic profile. The profile should include descriptions of what type of prairie they live in, their population status in Missouri, physical characteristics, diet, preferred shelter, predators and unique adaptations. Use the research to complete the following activities.

Prairie For Rent:

Bring in a copy of the classified portion of a newspaper. Go over the parts of a classified ad for housing or apartments. Most ads give you information about the size of the home, positive attributes, how the home is unique, and where it can be found. For a prairie species looking for a home they may be interested in what type of prairie is being offered and where it is located in the state. Food sources, population of predators and size of the prairie are all factors that may influence a species to call a part of the prairie home.

Once students are familiar with parts of a classified advertisement ad for a prairie that will suit the needs of the species they researched. When they are completed post the ads around the room. Assign a different species to each student and have them select the "house" ad that best meets their need. When everyone has found a home check with original ad writers to see if students are matched up correctly.

Adapted from: Cave for Rent, Missouri Department of Conservation

Who Am I?

Have students share their research with the rest of their classmates through a bulletin board display featuring pictures and profiles of each species or by compiling the research into a "Prairie Life" book for the entire class.

Form two equal teams. Each team chooses several of the prairie species. Using the profiles from the student's research each team comes up with six to eight riddle clues for every species they've selected. The clues should be progressively easier, proceeding from the general to the specific.

When each team has their clues ready the action begins. Situate teams on opposite sides of the room. The teams take turns giving clues. Each team decides beforehand which members will give which clues. Team A gives the first clue; then team B tries to guess the identity of team A's plant or animal. If they guess wrong nothing happens. Now team B gives its first clue and team A tries to guess the correct identity. This continues until one team successfully identifies the species being described.

Points can be awarded based on the number of clues needed to correctly identify the species. For example, if you are using eight clues and the opposing team guesses the correct identification with the first clue they are awarded 8 points, 7 points if they guess correctly on the second clue, 6 points for guessing with clue #3 and so on. Adjust accordingly when using six clues.

Adapted from: Animal Game, Sharing Nature with Children by Joseph Cornell

HOT OR COLD

9-12

Keeping Warm When You're Hot or Cold Blooded

From: *Amphibians and Reptiles, A Teacher's Guide*; Missouri Department of Conservation

Overview:

In this exercise, students will investigate temperature preference by reptiles and will attempt to keep a thermometer in a specific temperature range by thermoregulating.

Objectives:

Students will be able to:

- Define thermoregulation, hibernation, and estivation (SC3)
- Describe how a reptile can regulate their body temperature (SC 4)
- Explain why different species of reptiles are better suited to specific climates (1.1, 1.2, 1.3)

Materials:

Copies of reptile temperature range and habitat information cards
Thermometer for each group of students

Introduction:

Amphibians and reptiles are ectothermic, i.e., their body temperatures depend entirely on external heat sources. This has also been called cold-blooded. The sun is the main heat source, but they may get heat from other sources. Just as important as getting heat is being able to get rid of heat when the animal gets too hot.

Each species has a range of body temperatures in which it can survive. However, within the survival range is a smaller range in which the normal body functions are carried out; this is the species activity temperature range. Even within this active range, many species have a smaller preferred or optimal temperature range that they try to maintain. In general, amphibians have lower activity temperature ranges than reptiles. Few reptiles have activity temperature ranges below 20^{o} C.

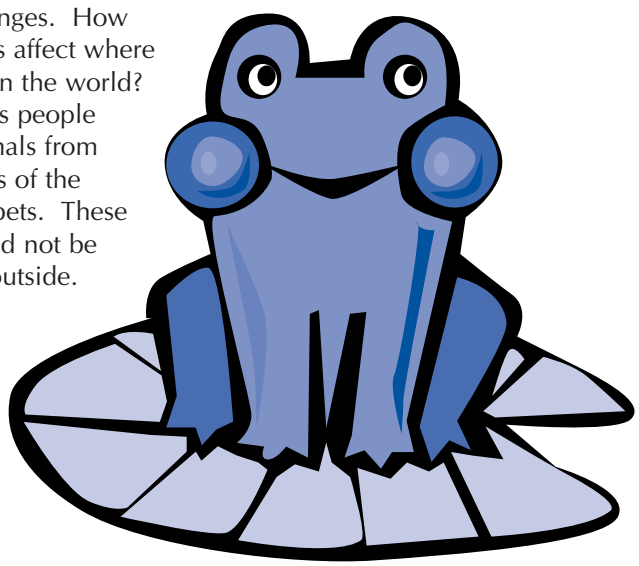
Thermoregulation may involve behavioral, physiological or morphological mechanisms. Basking is the most visible behavioral mechanism. Timing of activity (night, day, morning), burrowing, climbing trees and submersion in water are additional examples of behavioral mechanisms. Physiological mechanisms for cooling by panting, salivation, and urination or defecation on the body. To prevent cooling too quickly, reptiles and amphibians can reduce their heart rate and circulation to external body surfaces.

When conditions get too difficult for a reptile or amphibian to maintain body temperature, it can enter a time of dormancy or escape from the elements. Dormancy can be hibernation to avoid winter cold or estivation for all other situations (e.g., avoid extreme heat, avoid drought).

Procedure:

Can you keep a reptile warm?
(Adapted from Ranger Rick's Nature Scope activity.)

1. Pass out temperature cards (A cards) and thermometers.
2. Have pairs of students try to maintain the temperature range, on the card they received, for at least 10 minutes outside. They may have to do a variety of things with the thermometer to maintain that temperature range.
3. While the students are thermoregulating their thermometers, have them discuss ways that reptiles could maintain their body temperature in their preferred range (move to sun or shade, burrow, get in the water, climb a tree, etc.). How do reptiles survive the winter or the extreme heat of the desert?
4. Discuss when most reptiles hibernate in your area. Check average day and night temperatures for that time period.
5. Compare these dates and temperature data with known temperature ranges for reptiles and amphibians (see reptile temperature range cards B). Could these other reptiles survive in your area? How and in what part of the year.
6. Some of the reptiles/amphibians listed on the Reptile Temperature Range Cards have very broad temperature ranges and some have very narrow ranges. How would this affect where they live in the world?
7. Sometimes people keep animals from other parts of the world as pets. These pets should not be released outside. Why?



Temperature range & Habitat Cards

(Zug, 1993)

a 12-15˚C	a 16-19˚C	a 20-23˚C
a 24-27˚C	a 28-31˚C	a 32-35˚C
a 36-39˚C	a 40-43˚C	B Mudpuppy (Necturus maculosus) 5-30˚C Nocturnal/Aquatic
B Southern Redback salamander (Plethodon cinereus) 3-22˚C Nocturnal/Terrestrial	B Cricket Frog (Acris crepitans) 8-35˚C Diurnal/Terrestrial	B Timber Rattlesnake (Crotalus horridus) 13-33˚C Nocturnal/Terrestrial
B Six-lined Racerunner (Cnemidophorus sexlineatus) 30-42˚C Diurnal/Terrestrial	B Sea Turtle (Dermochelys coriacea) 22-32˚C Diurnal/Aquatic	B Aldabra giant tortoise (Geochelone gigantea) 23-32˚C Diurnal/Terrestrial
B Ornate box turtle (Terrapene ornata) 15-35˚C Diurnal/Terrestrial	B American alligator (Alligator mississip-piensis) 23-37˚C Nocturnal/Aquatic	B Worm snake (Carphophis amoenus) 14-31˚C Diurnal/Semifossorial

Meet the Projects

Need ideas on incorporating conservation and environmental education into your classroom? Want hands-on, interdisciplinary, fun activities that you can use to engage your students in critical thinking? Can you do all of this and meet state standards and district curriculum goals? The answer is YES! These curriculum and activity guides make it possible. Materials are distributed through educator workshops. Check the events calendar for one near you.

Project WILD assists learners in developing the skills needed to make informed decisions, exhibit responsible behavior and take constructive actions concerning wildlife and the environment. For more information contact Bruce Palmer, <palmb@mail.conservation.state.mo.us>.

Project Learning Tree materials bring the environment into the classroom and students into the environment. The program covers topics ranging from forests, wildlife, and water, to community planning, waste management and energy. In-depth high school modules include Focus on Forests, Forest Ecology, Solid Waste Management, and Risk Assessment. For more information contact Bruce Palmer, <palmb@mail.conservation.state.mo.us>.

Project WET (Water Education for Teachers) focuses on water resources as they relate to human needs and the natural world. Activities are centered on water as part of living and nonliving systems, quality, quantity, management and usage. For more information contact Joe Pitts, <nrpittj@mail.conservation.state.mo.us>.

Leopold Education Project uses the essays from Aldo Leopold's Sand County Almanac along with corresponding lessons to examine natural cycles, land use and environmental ethics. For more information contact Janice Green, <JaniceGreene@smsu.edu>.

Reference Materials

Listed below is a sampling of informational sheets profiling Missouri plants and animals that are available from the Department of Conservation. Useful for student research or classroom reference these profiles provide accurate, useful information. Single copies are available at no charge from the central office. For a complete list contact your local Conservation office or visit the Departments web site at www.conservation.state.mo.us.

Beaver E220
Coyote E223
Mink E225
Mountain Lion E226
Squirrels E231
White-tailed Deer E232
Lizards of Missouri E213
Missouri Toads & Frogs E430
Missouri Turtles E468
Snakes of Missouri E448
Bald Eagles in Missouri E466
Bluebirds in Missouri Nat021
Greater Prairie Chickens E219
Missouri Owls E455
Common Trees of Missouri F054
Missouri Forests F016
Missouri Urban Trees F084
Oaks & Hickories F022
Prairie Forbs E469
Poison Ivy E439